

FOR OFFICIAL USE ONLY

JPRS L/9973

9 September 1981

# Japan Report

(FOUO 53/81)



FOREIGN BROADCAST INFORMATION SERVICE

FOR OFFICIAL USE ONLY

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [ ] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

COPYRIGHT LAWS AND REGULATIONS GOVERNING OWNERSHIP OF  
MATERIALS REPRODUCED HEREIN REQUIRE THAT DISSEMINATION  
OF THIS PUBLICATION BE RESTRICTED FOR OFFICIAL USE ONLY.

FOR OFFICIAL USE ONLY

JPRS L/9973

9 September 1981

JAPAN REPORT

(FOUO 53/81)

CONTENTS

SCIENCE AND TECHNOLOGY

Office Automation Age Forecast (DIAMOND'S INDUSTRIA, No 8, 1981).....	1
USSR Seeks Lower Interest Rate for Purchasing Steel (JAPAN ECONOMIC JOURNAL, 18 Aug 81).....	13
Japan-U.S.-Sweden Coalition Set for Robot Production, Sales (JAPAN ECONOMIC JOURNAL, 18 Aug 81).....	14
Toshiba Machine Loses Soviet Deals (JAPAN ECONOMIC JOURNAL, 18 Aug 81).....	15
Caterpillar Mitsubishi Sells 400 Bulldozers to USSR (JAPAN ECONOMIC JOURNAL, 18 Aug 81).....	16
Sumitomo Metal Will Provide U.S. Steel With Pipe Technology (JAPAN ECONOMIC JOURNAL, 18 Aug 81).....	17
Research on Laser Resistant Optical Film (JAPAN ECONOMIC JOURNAL, 18 Aug 81).....	18
Satellite for Weather Use Is Launched (JAPAN ECONOMIC JOURNAL, 18 Aug 81).....	19
Toray Makes Zirconia Ceramic Having High Bending Strength (JAPAN ECONOMIC JOURNAL, 18 Aug 81).....	20
Asahi Glass Plans Using Ion Exchange Membrane Technology (JAPAN ECONOMIC JOURNAL, 18 Aug 81).....	21
Circuit Lines of 0.5 Micron Width Etched on Wafer by New Technology (JAPAN ECONOMIC JOURNAL, 18 Aug 81).....	22

- a -

[III - ASIA - 111 FOUO]

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

Douglas-Fokker Team Offers Flexible Terms for Plane Plan (JAPAN ECONOMIC JOURNAL, 18 Aug 81).....	23
Green Cross Acquires Interest in Collaborative Research Inc. (JAPAN ECONOMIC JOURNAL, 18 Aug 81).....	24
Government Begins Emphasis on Developing Biotechnology for Farming (JAPAN ECONOMIC JOURNAL, 18 Aug 81).....	25
Twelve Different Colors Identified by Unique Sensor (JAPAN ECONOMIC JOURNAL, 11 Aug 81).....	27
Nippon Oil Develops Fermentation Method for Making Fuel Alcohol (JAPAN ECONOMIC JOURNAL, 11 Aug 81).....	28
Structural Change of Petrochemical Industry Suggested (Editorial; JAPAN ECONOMIC JOURNAL, 11 Aug 81).....	29
Production Revolution Underway in Factories of Smaller Enterprises (Katsuhiko Hirano; JAPAN ECONOMIC JOURNAL, 11 Aug 81).....	31
Cable, Wire Makers Are Investing Heavily in Optical Fiber Equipment (JAPAN ECONOMIC JOURNAL, 11 Aug 81).....	33
Shipbuilders Moving Toward 'Revitalization' (JAPAN ECONOMIC JOURNAL, 11 Aug 81).....	34
Hitachi, GE Reach Overall Accord on Robot Production, Sales (JAPAN ECONOMIC JOURNAL, 11 Aug 81).....	35
Miti Will Ease Stand on Exports to Yamburg Project (JAPAN ECONOMIC JOURNAL, 11 Aug 81).....	36

- b -

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

OFFICE AUTOMATION AGE FORECAST

Tokyo DIAMOND'S INDUSTRIA in English Vol 11, No 8, 1981 pp 8-18

Article: "The Coming Office Automation Age"

Text

New Era

The 56th International Business Show was held at the International Trading Center in Harumi, Tokyo, from May 13 to 16, 1981. A total of 170 business firms, up 19 over the previous year, exhibited more than 15,000 items of products. This year, the number of pavilions was raised from four to five. Under the theme "office automation that creates management power for the 1980s," this year's business show featured the display and demonstration of business machines and information processing machines of both domestic and foreign manufacturers. The show clearly indicated rapidly growing interest in office automation in recent years by Japanese businesses.

From May 27 to 30, the "Microcomputer Show '81" was held at the Tokyo Distribution Center in Heiwajima, Tokyo. The number of visitors to this show was no less than that to the Business Show.

Although rapid business growth continues in some sectors, the Japanese economy has been placed in severe conditions forcing a shift

from fast to moderate growth. Until recently the Japanese business community had continued prosperity through the rationalization and automation of production lines. The community is now making a big stride forward to office automation. During the past few years the word "office automation" has been increasingly popular. The idea of office automation first emerged in the United States from the contention that productivity in offices was far behind that of production lines. And soon it was introduced to Japan.

At business shows, emphasis on exhibits has been shifting gradually from computers, copiers, facsimiles and other individual products to systems combining these business machines. Especially at this year's show, exhibits concerning the future of office automation attracted public attention.

Emphasis has also been shifting from data processing with big computers by professionals to the rationalization of clerical work at ordinary offices. At the Microcomputer Show, too, visitors were showing more interest in personal

FOR OFFICIAL USE ONLY



## FOR OFFICIAL USE ONLY

computers and related equipment under the category of "electric equipment." The production of facsimile in 1980 was valued at ¥81,018 million, a 30.9% increase over 1979, and that of computers and related equipment was ¥1,295,386 million, up 15.2%. Demand for business machine has been strong. Especially in 1980, all products showed high production increases thanks to a rising tide of office automation and brisk exports. The production of typewriters increased 33.9% in value, desk-top calculators 31.2%, cash registers 30.2% and copiers 24.7%.

The Japan Business Machine Makers Association in March published the estimates for the 1980 production of six major business machines and a forecast for 1981 production. The six products are electronic desk-top calculators, copiers, offset printers, microfilm equipment, western-letter typewriters and electronic cash registers. According to the estimate, 1980 production totaled ¥718,751 million. Of this, domestic demand was ¥212,727 million, up 10.1% over 1979. Exports totaled ¥506,024 million, up 27.4%. The 1981 forecast sets domestic demand at ¥222,600 million, up 4.6% over 1980, and exports at ¥571,680 million, up 13.0%. The total 1981 output would be ¥794,280 million, up 10.5%.

At the beginning of 1980, the association estimated 1980 growth at 6.8% for domestic demand and 7.7% for exports. But the actual business results far exceeded these figures. The growth rates for 1981 are kept low for worldwide business stagnation. However, the actual growth rate of each category of products will vary widely with its market conditions and the development of new products. According to MITI's machinery statistics, the growth rate of business machine production in 1973 — the year

of the first oil crisis — was 38.6% over 1972, which is in sharp contrast with those for the period from 1974 to 1979. They were 10.0%, 0.1%, 31.9%, 7.5%, 10.6% and 4.3% in annual order. Business machines heavily depend on export business. In general, growth rates are high, although there are big variations.

In May, the Business Machine Makers Association published a "business machine vision," in which it projected production and exports in 1985 and 1990. According to this, production would increase after 1980 at an annual rate of 6.3% to reach ¥986,536 million in 1985. After the year, the growth rate would be down at 6.2%, and the production will total ¥1,329,650 million in 1990. The ratio of exports to total output is set at 70.5% for 1985 and 67.1% for 1990.

However, these are the projections for the products included in MITI statistics as business machines. Besides these, there are office automation related products, such as word processors, electronic translators, office computers, personal computers, business-use facsimiles and business-use materials. If all these are included, production in 1985 and 1990 will be ¥3,676,500 million and ¥5,389,600 million, respectively. The average annual growth rates are set at 12.6% and 8.0%. As office automation spreads further, production will increase at higher rates. That, of course, will include various newly-developed machines.

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

## Copiers

### Intensifying Competition in PPC

Japan's copier production surpassed 1 million units in 1980. Demand has been strong centering on popular model PPCs (plain paper copiers). According to MITI statistics, copier output in 1980 totaled 1,123,720 units (a 24.7% increase over 1979), valued at ¥336,751 million, up 29.9%. Business growth is obvious when compared with the growth rates of 1979 — 13.2% in volume and 11.8% in value. And growth is more conspicuous in higher grade products. Copier exports in 1980 totaled ¥222,853 million, up 31.2% over 1979. The ratio of exports to production was 66.2%. Brisk exports are sustaining high levels of production, although the export ratio is not so high among business machines.

In the breakdown of 1980 production, indirect static type copiers — mainly PPCs — rose by 37.8% to 946,366 units, direct static type copiers — centering on electrofax types — were down 22.3% at 87,319 units, and other models, including diazo type copiers, down 11.8% at 90,035 units. As a result of rises in performance and falls in price, PPCs are replacing electrofax type copiers, while curbing growth of diazo type products whose copy costs are low.

Until only 10 years ago, Xerox of the U.S. had been controlling the world's PPC market. But the situation changed after Japan began manufacturing PPCs. Japanese makers concentrated their efforts on the development of small-sized models. Soon Japanese products swept the world market for their reasonable prices and high performance. A survey by the Japan Business Machine Makers Association shows that Japanese products accounted for only 7% of the world's PPC production of 167,000

units in 1970, but that in 1979 their ratio rose to 79% of the world's output of 889,000 units. Thus Japan has become the principal supply center of copiers for the world market.

The performance of small-sized Japanese PPCs is advancing every year, and they are becoming increasingly convenient with such new functions as cut-sized copying and sorter. They can now take different qualities of paper. In July, 1981, Sharp marketed what it claimed the world's smallest and lightest PPC, "Copy Ace SF-750." The machine, weighing 32 kg, can copy papers up to B4 size (364 mm x 257 mm) and make a maximum 99 copies in a row. With microcomputer control, the machine can also interrupt the continuous copying to take other copies. It is also equipped with a function of automatic diagnosis of operations.

In the market of high-grade models, Xerox still has a dominant position. But in May, 1981, Ricoh marketed a high-grade model, "ST 7500," which is capable of making 60 copies a minute and suitable for a monthly operation ranging from 20,000 to 120,000 copies. Thus Japanese products are steadily penetrating into the high-grade model market.

The plain paper copier is indispensable in the office automation era. Models that can be linked with computers and facsimiles are now being developed. At present, Ricoh is Japan's top copier maker. Fuji Xerox and Canon are competing to take the second position, followed by Konishiroku Photo Industry and Sharp. At the end of last year, Matsushita Electric Industrial, Olympus Optical and Kyoto Ceramic entered production of copiers. Their primary purpose appears to be development of models suitable for office automation systems. Naturally, their entry into the field is intensifying competition among makers.

FOR OFFICIAL USE ONLY



## FOR OFFICIAL USE ONLY

## Facsimiles

### Continuing Growth

The facsimile market has achieved big growth during the past several years. Behind the rapid spread of facsimiles are changes in the market situation. The telephone line was opened for general facsimile use in Japan in 1972. Until then, newspaper and few other companies were using facsimiles through exclusively contracted lines. Then, international standards for the equipment were established to enable communications between different models. Following G-I standards for low-speed models and G-II standards for medium-speed models, G-III standards for high-speed models were established in 1979, completing the system for general facsimile service.

MITI's statistics indicate spectacular facsimile production growth since 1977. The annual production growth in volume marked 50.7% in 1977, 61.8% in 1978, 48.3% in 1979 and 43.2% in 1980. The 1980 output totaled 100,375 units. In terms of value, the similar growth rate registered 55.7% in 1977, 43.7% in 1978, 45.2% in 1979 and 30.9% in 1980. The 1980 production was ¥81,018 million. The growth rates in value are lower than the rates in quantity increase, because the unit prices are declining.

Facsimile exports in 1980 nearly doubled to ¥15,101 million. But exports accounted for only 18.6% of the total output in value. The heavy dependence on domestic demand is a feature different from other main lines of office equipment. Demand for facsimiles that can transmit sentences in Japanese, including many Chinese characters, and charts is far stronger than that for teletypes for English and other European languages. The

handling of a facsimile is far easier than that of a teletype, too. The high-speed facsimile can also help cut expenses for communications. Price cuts brought about by technical advances obviously contributed to the spread of the machine.

Matsushita Graphic Communication Systems is the top facsimile maker in Japan, followed by Ricoh, NEC and Toshiba. Hitachi, Sanyo Electric and Canon are also turning out the product. These and other makers that exceed 20 in number are vying fiercely in technology and price.

Manufacturers are now developing two types of products. One is a compact sized, low-priced standard model for smaller businesses. The other is a high-grade model that would be incorporated into office automation systems. In May, 1981, Toshiba marketed COPIX 6000, a desk-top, compact, multi-functional facsimile that meets dual modes - G-II and G-III. In June, Matsushita Graphic Communication Systems put on sale UF-520 IV, a high resolution business facsimile which has 16 dots in one millimeter, compared with the ordinary 8 dots and the 12 dots of the highest resolution model for business use. The new model enabled the retransmission of transmitted data, which had been difficult in the past. With an application of the digital principle, the facsimile can now be used as an input or an output terminal of a computer, and is entering an era of rapid expansion as the office automation concept spreads.

On the other hand, the Nippon Telegraph & Telephone Public Corp., in a joint project with six electric appliance makers, has developed a small facsimile, "Mini Fax" (the transmittable size: 210 mm x 148 mm), and is making preparations to establish a facsimile transmission network for subscribers and eventually open it to ordinary households.

FOR OFFICIAL USE ONLY

## Office Computers

### Users Include Large Enterprises

A computer has gone out of the computer room to take its place in ordinary offices. Models actually used there are "office computers." Originally the computer needs to be housed in an air-conditioned, clean special room for satisfactory performance and is operated by specialists. The office computer, on the other hand, is a small model which is easy to handle and can be operated in the ordinary room by any businessman or office clerk as long as he or she has knowledge of how to use it. And such products have been developed and begun to be used widely in offices.

In Japan, the word "office computer" was used by Mitsubishi Electric Corp., when it marketed a small computer, "MELCOM 80" in January, 1968. Soon other makers began making small computers for office use, and the word "office computer" was established. The office computer has various limitations in performance, but its price is far lower than that of the ordinary computer. The office computer first gained popularity among small- and medium-sized businesses. But the bigger type of the office computer now has various functions typical of ordinary small computers, and its price has been reduced thanks to technological advancement.

Therefore, it is difficult to distinguish an office computer from an ordinary computer in both structure and performance. The Japan Electronic Industry Development Association has its definition for office computers — they are small or very small computers to be used in ordinary offices and their prices for standard system range from ¥3 million to ¥30 million.

According to its survey of computers of this category, their shipments from makers during fiscal 1979 totaled 20,828 units (up 64.4% over fiscal 1978), valued at ¥146,267 million (up 69.8%). Although the figures for fiscal 1980 are not yet available, the growth rates are estimated at about 30%. The idea of office automation began to be widely talked about in 1979. Since then shipments of office computers have been continuously increasing.

Among the 26 manufacturers and importers placed under the survey, Mitsubishi Electric, Nippon Electric and Toshiba form the top group of manufacturers, followed by Ricoh, Casio Computer, Fujitsu, Sharp and Uchida. In a recent trend, an increasing number of small businesses are buying low-priced models as their performances are improving rapidly. In addition, big businesses are joining buyers of office computers as the idea of office automation is spreading. Especially conspicuous is that office computers are being used as terminals of a big computer to divide the work load of the big computer. In February, 1981, Mitsubishi Electric marketed "MELCOM 80 Model 48," which has a maximum main memory capacity of 4 mega-bytes and can connect as many as 32 terminal devices.

Furthermore, the emergence of models with a Chinese character (*kanji*) processing function has greatly contributed to the spread of office computers. Demand for such models was especially strong from smaller businesses. The recent advancement of semiconductor technology has helped raise the functions of printer and display, lower memory costs and thus

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

introduce the *kanji* processing function to the office computer. About 60% of office computers now in production are of the *kanji* system.

In January, 1980, Hitachi, Ltd. developed a new *Kanji* Processing Extended Information System (KEIS) which can be used both in large computers and small ones, and employed it in the office computer L-330 of

HITAC L Series. The system was also adopted by L-320 that was marketed in September last year.

Makers have developed a number of application programs for accounting offices, hospitals, gas stations and various other business offices to promote sales of office computers to smaller businesses. The spreading of office computers will continue in the future.

---

### Personal Computers

---

#### Rapid Spread Begins

Personal computers for business use began to be employed by many offices around the mid-1980, and many makers have entered this field of business, which is booming today.

Both personal computers and office computers are applied products of microcomputers, and there are no clear distinctions between them. The office computer merely has a stronger image of a machine to be installed in an office, while the personal computer has the image of an instrument to be used by an individual. Therefore, the price of a personal computer is lower than that of an office computer. Small computers whose unit price is below ¥3 million are classified as personal computers. Actually, their standard prices range from ¥800,000 to ¥1,300,000, which are less than half

the lowest price of an office computer. Its main unit is priced at as low as ¥200,000. It first began to be used for games, and some expensive models were being used for civil engineering and other technological purposes.

However, computers of that type began spreading rapidly as makers developed general-purpose program packages and their costs became relatively low. The program package made computer operations easy for making various types of slips, the management of customer lists, the calculation of wages, sales control, stock control and other clerical works. It is, of course, possible to make programs for specific needs by using BASIC and other relatively easy computer languages.

NEC and Sharp are the Big Two of personal computer makers. They are followed by Hitachi, Sord Computer System and Oki Electric Industry. There are more than 20 makers. But the top three hold more than 80% of the market. Many makers are expanding production facilities in order to fill the rapidly expanding market. Newcomers are also joining the business.

The performance of the personal computer is speedily improving thanks to the advances in LSI (large scale integration circuit). Competition with office computers of the lowest rank will intensify in the future. The top maker, NEC, is selling a business personal computer NEC system 20/25, which is priced at slightly lower than ¥3 million. It is equipped with a communication device to receive data from computers or data terminals at distances away. Eight different melodies indicate the conditions of the system. In April, 1981, Sharp marketed the "Clean Computer MZ-80B," which is equipped with a high-speed microprocessor of 4 MHz. It also has a unique function to store programs in the standard cassette tape for audio use.

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

In April, 1981, Tokyo Electric Co. concluded a business tie-up arrangement with Tandy Corp., the top personal computer maker in the U.S. Under the accord, Tokyo Electric will market Tandy products in Japan and begin assembling main units in Japan. Earlier, American products were imported for hobby use. But now, Japanese-made personal computers for business use are spreading, and U.S. makers are joining hands with Japanese firms to expand their market in Japan.

Although there are no government statistics on office computers and personal computers, it is no doubt that their markets are expanding rapidly. At the same time, sales competition is becoming increasingly fierce, as more makers join the market.

---

### Word Processors

---

#### Strong Demand

In the United States and Europe, the word processor opened the way for office automation. In Japan, however, the development of word processors was delayed due to difficulty in handling Chinese characters. In September, 1978, Toshiba marketed a word processor capable of processing Japanese words for the first time. It was followed by Sharp, NEC, Fujitsu, Oki Electric and others. The full-scale marketing of word processors in Japan began during the second half of last year. Shipments in fiscal 1980 totaled about 2,000 units. The figure for fiscal 1981 is estimated to surpass 3,000 units.

The word processor can call out from its memory such standardized sentences as those for contract and personal appointment formats, fill in

necessary words and thus complete the sentences. It also has editing functions, such as rearrangement of sentences or making corrections by using the display. Therefore, the word processor is often being used for a Japanese language typewriter. In the future, the role of a word processor in office automation will be expanded greatly by connecting it with other word processors, computers or facsimiles.

A survey by the Nihon Office Management Association shows that as of the end of November, 1980, 14.3% of the 529 firms, including those listed on the Tokyo Stock Exchange and computer centers, were using Japanese language word processors and 7.7% of them had plans to introduce the machines. In the survey the ratio of those who had at least some knowledge of a word processor was 85.4%. Although the word processor was still quite new on the market at that time, the survey indicated that business firms had strong interest in that particular product.

The descriptive system of the Japanese language is far more complicated than those of English and other European languages. The number of Chinese characters for daily use alone exceeds 1,900. It is, therefore, difficult to limit the number of Chinese characters, called *kanji* in Japanese. And a *kanji* often has several ways of reading it. There are also homonyms. Therefore, the input of Japanese words is very difficult. In a system, letters are selected by the pen-touch of tablets as those of a Japanese language typewriter. In another system, *kana* (Japanese alphabet) is used for input. The former system is certain but requires skills, and the time required to select letters is longer than in the latter system. The former type is more popular in clerical offices, while

FOR OFFICIAL USE ONLY

## FOR OFFICIAL USE ONLY

the computer and technical divisions prefer the latter type. Sharp represents the former system, while Toshiba represents the latter type.

Even in the *kana-kanji* conversion system, there are two formulas. One is to take the reading *kana* of *kanji* into the machine as it is read. The other is to put two letters of *kana* which suggest the *kanji*. In July, 1981, Toshiba announced a model of Japanese language word processor, "BW-20," which combines the two formulas, and also can select a tablet type. It is still too early to predict which type will be the popular line.

On the other hand, NEC marketed a Japanese language word processor of cluster system in May, 1981. It can handle up to eight work stations for input use so as to raise the cost efficiency of the word processor, because the Japanese language printer attached to the machine is expensive and of a high speed model.

Ricoh plans to market two types of Japanese language word processors. One is "RIPORT 600 Series," which has a facsimile function - the first of the kind in the world. Thus the word processor will incorporate many functions to connect with other kind of business machines in the future models. Models for Chinese or other languages that do not use the alphabet will be developed in the future.

---

### Typewriters

---

#### Electronic Application Widens Scope

According to MITI's production statistics, typewriter production in 1980 totaled 2,587,975 units (up 33.9% over 1979), valued at ¥51,816 million (up 39.3%). Exports rose by 48.2% to ¥48,888 million. The ratio of exports to the total output was 94.3%. Most products are of European

languages. Export dependency is extremely high, and the 1980 output increased sharply with brisk exports.

The fact that production growth in value was higher than in volume indicates that production is shifting to high-grade products. While the manual type showing steady growth, the electric type is making big increases. The most advanced typewriter is an electronics-applied model.

In the marketing of electronic typewriters, Olivetti of Italy took the lead. It was soon followed by makers of West Germany and the United States. Among Japanese makers, Brother Industries was the first to have developed that type. It began exporting such products last year. Silver Seiko announced an electronic model in March, 1981. Canon, which had not made typewriters, recently entered this field of business. Olivetti made a commission contract with Tokyo Juki Industrial for production on the OEM basis. Olivetti probably considered it profitable to commission the manufacture of its products to Japanese industry which is leading the world in electronics.

The electronic typewriter has editing function and is expected to show a big market expansion by playing an important part in the current office automation boom. In other words, a new area of business has opened for Japan which is advanced in electronic technology. It is quite conceivable that even electronic equipment makers will enter this field in the future.

FOR OFFICIAL USE ONLY

## Electronic Calculators

### Multi-functions

Technological advances in semiconductor and display enabled great functional improvements of the electronic calculator, reduced its size and lowered its price during the first half of the 1970s. As a result, the market grew rapidly, while the number of manufacturers increased and they continued to expand production. In 1977, however, they were forced to carry out large production cutbacks and reorganize their industry. It was once thought that growth of the industry had come to a halt. But growth is now returning to the industry again.

According to MITI's production statistics, the output fell from 40,426,133 units in 1976 to 31,835,113 units in 1977. The annual fall was 21.3%. Exports were 28,170,000 units in 1977, down 19.9%. It appeared that both domestic and overseas markets were flooded with excessive quantities of products. And, many makers disappeared from the markets.

With only a year of production adjustment, the 1978 output went below the 1976 level in value but above that in volume. The output in 1979 increased further in volume but was still below the 1976 level in value. The product became smaller and thinner, and the price declined further. Competition was also intensifying among makers. It was especially harsh between Casio Computer and Sharp, two leading makers in this country.

The output in 1980 totaled 60,356,160 units, up 31.2% over 1979. Its value was ¥202,279 million, up 16.3%. Exports rose by 37.4% to 49,650,000 units. Electronic calculator business fully regained activity.

The domestic market, in fact, is in a saturated state, but makers are trying to expand their market by marketing new models with multi-functions, such as melody, watch and digit-taking (million or billion) functions.

In July, 1981, Casio Computer, the top maker, marketed FT-7, a new calculator incorporating "hobby functions" — telling one's fortune and affinity with another person by using the data of the year, month and day. In March and April, Casio marketed two programmable electronic calculators in pocket-size notebooks, which have the functions of a personal computer.

Sharp Corp., which has long been making solar batteries of single crystal silicon for light house and other uses, marketed an electronic calculator with a built-in solar battery in December, 1976. This product, free from the trouble of replacing dry cells, maintains steady popularity. The only problem was that the solar battery was expensive. The price has now dropped considerably thanks to mass production and technical advances. The "solar calculator" cost ¥24,800 each when it was first marketed. The most inexpensive model now carries price tag of only ¥3,900. Sanyo Electric is marketing a similar product with a solar battery of amorphous silicon. The efficiency of this battery is lower than that of the single crystal silicon, but its production cost is likely to fall faster than the single crystal one.

Canon, ranking third in this field of business, marketed a calculator with a digit-taking function last year. In March of this year it added a watch that shows the date, hour and minute with Chinese characters. Casio Computer also marketed a model with a display in Chinese characters and a digit-taking function. New products are likely to become increasingly multi-functional in the future.

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

---

## Electronic Cash Registers

---

### Systematization

Electronic cash registers began replacing the mechanical type in 1971. In the market of mechanical cash registers, NCR Japan (subsidiary of NCR Corp. of the U.S.) and other firms with foreign capital had been dominating Tokyo Electric and other Japanese makers. However, Tokyo Electric and NCR Japan began marketing electronic cash registers at about the same time. They were followed by Sharp, Casio Computer, OMRON, Tateishi Electronics, Sanyo Electric, Matsushita Communication Industrial and other electronic equipment manufacturers; and the market structure changed drastically. Export business has also become active. At present, Tokyo Electric, top maker, and NCR Japan, 2nd, hold a combined domestic market share of 80%.

According to MITI's production statistics, the output of cash registers in 1980 was 1,143,178 units, up 30.2% over 1979. It was valued at ¥86,882 million, up 12.2%. Exports in that year rose by 37.9% to 860,000 units. The growth of domestic demand was about 10%. Thus exports pushed up production. The average price is declining every year. Exports are expected to increase for years to come, since many users overseas are still using mechanical type products.

Meanwhile, an increasing number of department stores, supermarket chains and other big retailers are systematizing the management of sales that involves cash registers. To meet their demands, some major cash register makers have established subsidiaries to specialize in software.

---

## New Electronic Products

---

### In Pursuit of Possibility

The development of office equipment in recent years owes much to incessant advances in electronic technology. In fact, some new products, which appear to be quite promising, are beginning to emerge.

One such product is an electronic translator. In November, 1979, Sharp marketed an English-Japanese, Japanese-English electronic translator, IQ 3000. It is, of course, made by an application of technology in electronic calculators. Japanese words appear in Romanized form in the display. Later Sharp marketed modules for German, French, Spanish and other languages. It is for beginners and far from practical use. If the memory capacity is expanded, it can be more useful. In the meantime, Canon and Casio Computer also marketed similar products, and still other makers announced the manufacture of test models.

In June, Sharp marketed IQ 5000, an electronic translator that can produce voice by using voice synthesis techniques, which have shown a remarkable progress during the past few years and have been applied to practical use in various fields.

In March, 1978, Nippon Electric Co. (NEC) marketed a voice input device for specified speakers, DP-100. This unit recognized a registered voice pattern and gives instructions made by the speaker of that pattern to a computer. This is the first device in the world that can recognize continuous sounds. In March, 1980, NEC also marketed a voice input device that would respond to unspecified voice

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

patterns, although the number of words it could recognize was only 16. Since vowel sounds are clear in Japanese, its voice recognition is relatively easy compared with other languages. Toshiba announced a test model of the Japanese language word processor with a voice input unit. Users of office equipment have great expectations for development of a high performance voice input device, because data input is one of the most troublesome parts of data processing in the current system.

As office automation advances, demand for an elevation in the performance of office equipment is becoming increasingly strong from among its users. In this field, too, the Japanese office equipment industry will continue to show striking advances, since Japan holds a dominant position in electronic technology for non-military use.

COPYRIGHT: Diamond Lead Co., Ltd. 1981

CSO: 4120/310

FOR OFFICIAL USE ONLY



FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

USSR SEEKS LOWER INTEREST RATE FOR PURCHASING STEEL

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 968, 18 Aug 81 p 3

/Text/

The Soviet Union has rejected its earlier agreement on financing terms set for securing 300,000 tons of steel plates from five big Japanese steelmakers, according to steel industry informants here.

The Russians in the middle of July had agreed to accept such steel at a financing term of 7.75 per cent per annum over five years.

However, the informants said that the Russians lately had made known through trader Mitsui & Co. that they wished to drop this agreement and intended to forego the steel deal unless the interest rate in financing was lowered to 7.25 per cent.

The Russians were said to have come around to taking a strong buyer's position since all European steelmakers, which have been carrying out big production curtailments owing to the recession, have begun offering financing terms of 7.25 per cent or less per annum for their exports.

Since refusing to match their sales conditions with those of the Europeans may lead them

to losing all steel exports to the Soviet Union, not only for this year but also for next year, the Japanese steelmakers are now going to ask the International Trade & Industry Ministry and the Ministry of Finance to allow them to "export at 7.25 per cent."

A mission of Japanese steelmakers and traders in the middle of July visited Moscow and reached an agreement with the Russians on the following terms for export of steel plates:

—Three hundred thousand tons of steel plates will be exported during the period from October to July, next year with supplier's credit offered on a private basis.

—The deferred payment interest rate will be set at 7.75 per cent per annum over a period of five years as in the earlier agreed case of the Japanese exporting large diameter steel pipes.

With this understanding, all that had remained, until the Russians' scrapping of this financing term, was the question of boiling down prices by the early part of August.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/312

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

JAPAN-U.S.-SWEDEN COALITION SET FOR ROBOT PRODUCTION, SALES

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 268, 18 Aug 81 p 7

/Text/

A far-reaching coalition among influential enterprises of Japan, the U.S. and Sweden will be realized around October in the field of high efficiency industrial robots.

Kawasaki Heavy Industries, Ltd., Japan's leading maker of heavy machinery as well as industrial robots, and Unimation, Inc., America's top robot builder, will team up with Sweden's ASEA (Allmanna Svenska Elektriska AB) in the sector of "intelligent" robots equipped with human eyesight function.

The international grouping will go beyond, in importance, the existing technological tie-up between Kawasaki HI and Unimation, aiming at attaining even more broader cooperation as to technology, production and marketing.

Kawasaki HI has basically agreed on Unimation's proposal that ASEA join their group.

Unimation President Joseph F. Engelberger is expected to visit Japan in October to confer with Kawasaki executives on details of the proposed coalition with the Swedish company.

Behind their move is the rising zeal of worldwide enter-

prises to work together in the rapidly growing robot business, as exemplified in an earlier tie-up arrangement between Japan's Hitachi, Ltd. and America's General Electric Co. (JEJ August 11 issue, Page 7)

Other specific factors underlying the planned tie-up among the trio are:

—ASEA, while staging robot sales drive in the U.S., has begun to face strong rivalry from Japan-built robots in its home markets in Europe.

—Unimation is strongly seeking an even closer link with Kawasaki HI, which represents robot makers in Japan, a "robot kingdom" where 70 per cent of the world's industrial robots are now used.

ASEA, with 40,000 workers under its payroll, is a leading European heavy machinery maker. Late last year, the company completed a robot-producing factory in Detroit. Its robot production capacity thus stands at 500 units a year. The company has sold a total of 1,000 robots to 20 countries of the world.

Unimation, the world's top-rate robot maker, produces 800 units a year for delivery chiefly to General Motors Corp. and other automakers.

In 1968, the Connecticut company concluded an agreement with Kawasaki to provide its technological know-how. At present, however, the tie-up has changed into an equal technology exchange contract, now that the Japanese firm has attained a remarkable technological improvement of producing 700 units a year.

Both companies now sell their robots in Europe as well as the U.S.

When the trio works together, their combined production of high grade robots will come to some 2,000 units a year — about 30 per cent of the world markets.

Adjustment of production models among the three companies in accordance with their respectively strong branches will prove greatly effective in cutting production costs, leading to more expansion of their combined market share.

All of the trio will also be able to mutually use their individual sales networks.

Kawasaki and Unimation are now jointly developing an even more sophisticated, intelligent robot for simultaneous marketing in Japan and the U.S. in a few years. ASEA is expected to join this project.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/312

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

TOSHIBA MACHINE LOSES SOVIET DEALS

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 268, 18 Aug 81 p 7

/Text/

Toshiba Machine Co. has been underbid by European competitors in all of its machine tool export deals with the Soviet Union under the latter's 11th five-year plan beginning this year.

The persistent climb of the yen's exchange rates against the German mark and other European currencies is to blame for the failure of Toshiba Machine to win Russian orders.

The Tokyo-based company surmounted the first oil crisis in 1973-74 by emphasizing exports to the Soviet Union, Romania and other Communist Bloc countries.

Toshiba Machine, along with another Japanese machine tool builder, Mitsui Seiki Kogyo Co., is highly dependent on exports to Soviet Russia. Its exports to the country under the 10th five-year plan ran to some ¥18 billion.

Also under the new Soviet plan, inquiries amounting to around ¥25 billion had been received by Toshiba Machine since late last year.

However, the situation has turned unfavorable for the Japanese company. It has suffered crushing defeats in the Soviet deals, losing horizontal boring machine contracts to West German and Italian competitors and roll grinding machine contracts to West German rivals.

A Toshiba Machine official said, "We could not enter into full talks with the Russians to explain the capabilities and specifications of our products in almost all of the proposed deals. Our approaches came out unsuccessful in the very initial stage of quoting prices. There were wide gaps between our price quotations and those of European makers."

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/312

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

CATERPILLAR MITSUBISHI SELLS 400 BULLDOZERS TO USSR

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 268, 18 Aug 81 p 7

/Text/

Caterpillar Mitsubishi Ltd. announced last week that the company had concluded a contract with the Soviet Union to supply 400 bulldozers and related equipment, worth some ¥7 billion, for delivery to Siberia by February, 1982.

Trader Mitsubishi Corp. acted as the intermediary negotiator in the export deal.

Each of the tractors with powershift transmission, weighing 17.5 tons, is of the medium-sized D6D trace type having 142 horsepower. The machines will be equipped with a straight blade and ripper for excavation work on frozen ground.

Japan-built bulldozers and other construction machines are due to be exported to Soviet Russia in exchange for Siberian lumber under the basic agreement signed between the two countries in March, this year on the basis of the third Soviet-Japan joint Far East Forestry Resources Development Project, called the KS Project.

The value of Japanese construction machinery set in the basic accord amounts to ¥230 billion in all, in which Caterpillar Mitsubishi's 400 bulldozers have recently been included. Other desired Russian items include 1,100 more bulldozers, 2,000 lumber transport machines, and 500 to 1,000 fork-

lifts and truck cranes.

As for Caterpillar Mitsubishi, the company so far has exported 1,900 bulldozers, including 1,700 delivered under the first and second KS Projects. The newly-contracted 400 will be in addition to them.

These construction machinery export deals with the Soviet Union coincide with the Japanese Government's policy of easing economic sanctions against the country from around last spring.

Construction machinery builders, now suffering from sluggish domestic demand, are anxious to win Russian orders following Caterpillar Mitsubishi's successful deal.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/312

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

SUMITOMO METAL WILL PROVIDE U.S. STEEL WITH PIPE TECHNOLOGY

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 268, 18 Aug 81, p 6

/Text/

Sumitomo Metal Industries, Ltd. has concluded a contract with United States Steel Corp., the America's largest steel-maker, to provide technical aid for a seamless pipe mill, the leading Japanese steel firm announced last week.

Under the contract, Sumitomo Metal will help the U.S. firm improve the quality of its seamless pipes produced at its two plants — one in Ohio and the other in Pennsylvania and upgrade the technology for operating the two plants.

The Japanese company so far has given technical assistance of various kinds to the U.S. steelmaker, such as for producing large-diameter pipe. The latest seamless pipe contract constitutes the fifth agreement between the two companies.

Sumitomo and U.S. Steel have yet to boil down detailed points concerning the technical help. But they agreed that:

—Sumitomo Metal will dis-

patch its technicians and engineers to its American partner shortly and begin an investigation.

—Sumitomo will check whether improvement should be made on facilities and production of the two plants and submit a report to U.S. Steel.

—U.S. Steel will send its staffers to Sumitomo for training in Japan.

As for the schedule of sending engineers, the two companies will negotiate on the matter in the near future.

The American company sought the Japanese assistance largely because the pipe making machinery at its two plants are outdated, causing a lack of uniformity in quality. Operation of the two plants thus have become inefficient, according to Sumitomo.

Sumitomo Metal is rated high in seamless pipe technology.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/312

## FOR OFFICIAL USE ONLY

## SCIENCE AND TECHNOLOGY

## RESEARCH ON LASER RESISTANT OPTICAL FILM

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 268, 18 Aug 81 p 13

/Text/

The Government-affiliated Research Development Corporation of Japan recently announced two new projects: 1) Development of a method to produce optical film resistant to the destructive power of strong continued laser beam bombardment, and 2) Development of a method obtaining energy by gasifying plastic-containing industrial waste matter deep in a hot sand pile.

According to the corporation in Tokyo, the two methods, already developed in their basic ideas respectively by Prof. Yoichi Murayama of Toyo University in Tokyo and Prof. Taizo Kunii of the Engineering Faculty, University of Tokyo, will be polished up into really applicable processes by two domestic companies it has named to undertake the jobs as usual with all its projects of the kind. The two companies are Showa Optical Co. and Tsukishima Kikai Co., both of Tokyo.

Showa Optical is to develop the first of methods for the corporation in three years at a total cost of ¥120 million, while Tsukishima Kikai the second in two years for a total cost of ¥250 million. The governmental corporation will pay the

costs.

According to the corporation, laser beams, now widely used for industrial processing, communication and medical purposes, in the case of industrial product or material processing, require many kinds of filming or plating to the surface of the lens and reflector of the processing machine. Included in such kinds are a "beam reflection preventing" type to let the beam penetrate its object well by minimizing the undesirable reflections, a beam reflection-boosting type to increase the reflections to assist the preventing type, and multiple-layer polarizing plating to separate the beam into various components.

While such filming and plating have been developed, every attempt to increase the output of the laser beams has come to demand a new kind of such filming strong and durable enough against the destructive force of such beam bombardments, especially when long continued. But the conventional vacuum deposition method of producing such filming has been limited in ensuring such strength of filming, and also in guaranteeing the good attach-

ment of such filming with the lens or reflector surface.

The academically-devised answer to the problem consists in building a multiple-layer structure of 20 to 40 alternate piles of high-refraction materials like titanium oxide and zirconium oxide and low-refraction materials like silicon oxide. The method also involves a "high-frequency ion plating" process to heat each such material into thin filming with a high-frequency electric power coil and a special film polishing process to remove all defects on the surface of such filming.

The scholarly solution to the also difficult plastic-involving waste burning question is to mix such waste matter with heated sand in a funnel-shaped inversely conical furnace. Pastics in such wastes, including milk and other beverage-vending containers, will be heated into gas at the bottom of the furnace when the hot sands are circulated by air blowing through a lower side hole. The gas to be thus derived will have at least 2,000 kilocalories of energy per cubic meter, high enough to be used as an industrial fuel.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/312

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

SATELLITE FOR WEATHER USE IS LAUNCHED

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 268, 18 Aug 81 p 13

/Text/

The National Space Development Agency succeeded last Tuesday in placing a 292-kilogram meteorological satellite into a drift orbit.

The satellite, christened Himawari (Sunflower) II, will be gradually moved to a permanent geostationary orbit over New Guinea at a point 140 East Longitude over a space of a month.

It will replace the present Himawari satellite and start sending pictures of cloud formations around Japan from late December.

NSDA launched a three-stage N-2 rocket early Tuesday morning at its space center on Tanegashima Island, Kagoshima Pref. The rocket placed the satellite, measuring 2.15 meters in diameter and 3.45 meters in length, into its scheduled orbit. This is the first time that Japan has launched a geostationary meteorological satellite (GMS) for practical use on its own. The present Himawari satellite was sent up with the help of U.S.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/312

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

TORAY MAKES ZIRCONIA CERAMIC HAVING HIGH BENDING STRENGTH

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 268, 18 Aug 81 p 13

/Text/

A new engineering ceramic, having the world's highest bending strength of all such modern industrial ceramics at room temperature, has been commercially developed by Toray Industries, Inc. of Tokyo. The ceramic is a sort of sinter of zirconia (zirconium oxide) with a 3 per cent yttria (yttrium oxide) addition.

According to the first-rated Japanese synthetic fiber maker with many chemical sidelines, its new engineering ceramic—"fine ceramic" or "new ceramic" in Japan's technological terminology—could be widely applied to tools, machine parts and cutting edges requiring such high bending strength or toughness, including wire-drawing dices.

The Government's Mechanical Engineering Laboratory, cooperating to find such uses, is already trying out the new product in making surgical and cooking knives. The new product is believed unfit for use under extremely high tempera-

tures zirconia itself may withstand, but its sinter cannot, in contrast to other kinds of new ceramic like silicon nitride or silicon carbide.

How to bake the new product's materials, a powdered form of the salt remaining after smelting zirconium-containing ore, and yttria under a high pressure is said to be the same as producing any other engineering ceramic, the company explained.

But the new product, as so far tested, proved to have maximum strength to withstand between 150 and 170 kilograms of weight per square millimeter, compared with 130, hitherto the world's highest for a silicon nitride equivalent.

In toughness (as expressed by "Young's modulus"), it has surpassed all sorts of fine ceramics so far known to have been developed. Such modern ceramic have had the common drawback of brittleness.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/312



FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

ASAHI GLASS PLANS USING ION EXCHANGE MEMBRANE TECHNOLOGY

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 268, 18 Aug 81 p 12

[Text]

Asahi Glass Co. is considering replacing the asbestos diaphragm with the ion exchange membrane technique for caustic soda production at its Kita-Kyushu plant by the spring of 1982. The top soda maker here will become the second after Kanegafuchi Chemical Industry Co. to carry out the change.

The Asahi plan calls for replacing one half of Kita-Kyushu facilities, whose monthly capacity is rated at 1,370 tons. The existing electrolytic cells will remain intact, with the distance between electrodes being narrowed.

No official operational data have been announced. But the company's experimental replacement is believed to have reduced electric power consumption to less than 2,500 kilowatt hours per ton of caustic soda. The soda concentration is

35 per cent.

The Asahi know-how eliminates consumption of steam, as required by the diaphragm process (about 2.7-3.0 tons per ton of 35 per cent soda). The diaphragm technique requires larger amount of power (2,700-2,800 kilowatt hours).

The soda industry replaced about two-thirds of its mercury cells with the diaphragm techniques by fiscal 1975, as ordered by the Government. But the industry found that the diaphragm technique requires more electric power than mercury cell route (which the Government will in effect ban).

It seemed that the ion exchange membrane developers, including Asahi Glass, will intensify their licensing race not only for replacement of mercury cells but the diaphragm technology.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

GSO: 4120/312

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

CIRCUIT LINES OF 0.5 MICRON WIDTH ETCHED ON WAFER BY NEW TECHNOLOGY

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 268, 18 Aug 81 p 13

/Text/

A new ultra-microscopic semiconductor circuit printing method of ionization and chemical reaction type for etching circuit lines of no more than 0.5 microns in width on a few millimeter-square silicon chip has been experimentally developed by a laboratory of Nippon Telegraph and Telephone Public Corp. (NTT).

According to NTT's Musashino Electrical Communication Laboratory, the most densely integrated version of integrated circuit semiconductors so far commercialized, that is, the First Generation of very large-scale integrated circuits (VLSI), is the 64-kilobit RAM (random access memory) type of VLSI circuits, with about 150,000 electronic elements printed on such a tiny chip.

The Second Generation, already developed at laboratory level, is the 256-kilobit

RAM type with some 600,000 electronic elements similarly printed.

While the First Generation circuits require a precision printing (etching) process going down to 2 or 3 microns in circuit line width, the Second Generation needs a more sophisticated process reaching down to 0.5 microns in that width.

But NTT's laboratory, engaged in developing such technology since 1975 together with Nippon Electric Co. (NEC), Hitachi, Ltd., and Fujitsu Limited, already has finished developing the Second Generation circuit printing process by March, this year, and has since been studying how to print Third Generation, or a 1 mega-bit RAM type, capable of packing no less than 2.4 million elements on such a midjet chip.

The new method is a decided departure from the past optical or electron beam method. It is tentatively known as the Electrocytron Resonance (ECR) process to do every such extremely complex and dense etching job at a stroke by the impact of ionization of chemical substances and the chemical reaction in the resulting plasma.

NTT's new achievement, when refined, means completion of Japan's technology of basically etching the next generation VLSI circuitry along with a new high-precision electron beam exposure photo-mask producing and an X-ray exposure circuit transcribing method (from the original pattern to wafer) jointly developed with the cooperating companies on the basis of such exposure devices developed together with Hitachi and Nippon Kogaku K.K.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/312

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

DOUGLAS-FOKKER TEAM OFFERS FLEXIBLE TERMS FOR PLANE PLAN

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 268, 18 Aug 81 p 7

/Text/

McDonnell Douglas Corp. of the U.S. and Fokker B.V. of the Netherlands have started inviting Japanese aircraft makers to participate, on an equal basis, in a tieup to develop a jet civil aircraft of the 150-seater class, in whatever area of the project the Japanese want.

The McDonnell Douglas-Fokker team extended the invitation through the chairmen of the two companies, James S. McDonnell and F. Swarttouw to three Japanese aircraft companies and an association of Japanese aircraft and engine makers for new aircraft development.

The noted American-Dutch team announced last May their MDF100 development project. The target date for starting regular flights is set for 1986.

The two chairmen, while in Japan earlier this month, indicated their companies' willingness to accept Japanese

participation in the project when they visited the head offices of Mitsubishi Heavy Industries, Ltd., Kawasaki Heavy Industries, Ltd. and Fuji Heavy Industries, Ltd., and also the Civil Transport Development Corp.

The chairmen also visited the Ministry of International Trade & Industry and briefed an official on their companies' joint venture and invitation.

The McDonnell Douglas-Fokker team welcomed any Japanese aircraft maker to join the venture as a full partner from the outset of the project in any area, including design, production and sales.

The two chairmen, however, tentatively suggested what they believed to be the best choice for the Japanese — undertaking development and production of the wings and of about one-fourth of all the responsibility, including cost, for the project.

Japanese companies approached are postponing their answers pending closer talks

with the U.S.-Dutch team, because the total estimated cost of the project is yet to be determined.

Another important consideration has logically held up their immediate response. The Japanese trio, in their capacities as members of their association, CTDC, strongly backed up by MITI, had been talking with Boeing Co. and some West European aircraft makers since 1980 on Japan's own plan to develop a similar series of jet transports.

To complicate the matter further, a Boeing spokesman recently said his company will open official talks with such Japanese companies on its own B7-7 jet transport development project, which is said to have already unofficially been made known to Japan with more rigid participating conditions.

But Boeing is believed to have started a competitive move in the face of the McDonnell Douglas-Fokker team's wooing of the Japanese participation in its venture.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/312

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

GREEN CROSS ACQUIRES INTEREST IN COLLABORATIVE RESEARCH INC.

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 268, 18 Aug 81 p 3

/Text/

Green Cross Corp. last week decided to acquire a minority interest in Collaborative Research Inc. of Boston. The acquisition will make the Osaka pharmaceuticals maker the first Japanese investor in any U.S. genetic engineering venture business.

Green Cross will acquire 14,000 shares of CRI stock, worth \$1 million. This will be a part of new shares the U.S. company is issuing. The remaining \$5 million-worth shares are to be purchased by Dow Chemical Co., according to Green Cross. Green Cross's equity holding in the U.S. firm will be 1.1 per cent.

CRI and Green Cross have been closely cooperating in the development of interferon since last spring when the two firms signed an agreement under which CRI provides Green Cross with production knowhow for the gamma type of interferon. Green Cross has thus become the first Japanese supplier which can produce all the three types of interferon — alpha, beta and gamma —, a protein believed to block multiplica-

tion of viruses, and to be a potential "wonder drug."

Although the Japanese company's shareholding in CRI is small, its equity participation in CRI is believed to help advance their collaboration both in technology development and exchange of information.

Many of the U.S. venture business in the field of genetic engineering, which are estimated to number some 50, recently are reported actively searching for major investors from Japan and other parts of the world. Another U.S. genetic engineering company, Enzo Biochem of New York, has already set up a joint venture this month in Tokyo with a Japanese trader in order to conduct joint technological development with Japanese researchers, and to look for investors here.

All of the leading U.S. genetic engineering firms, including Genentech Inc., Genex Inc. and Cetus Corp., reportedly have been talking with various Japanese interests on possible cooperation on biotechnological research and capital tie-ups, in the past months.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/312

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

GOVERNMENT BEGINS EMPHASIS ON DEVELOPING BIOTECHNOLOGY FOR FARMING

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 968, 18 Aug 81 p 3

/Text/

Both the Japanese Government and the ruling Liberal-Democratic Party have recently started paying sharp attention to developing Japan's modern biotechnology for agriculture in the belief that such studies will be of immense importance to Japan from the standpoint of guaranteeing its own food supplies over a long period.

The Ministry of Agriculture, Forestry and Fisheries and the governmental party have disclosed they are seriously considering developing the agricultural phase of biotechnological research in Japan. They share the current international opinion that modern biological science and technology, including genetic engineering, now in its most promising facet, could revolutionize farming in the interest of human survival.

There has been an obviously strong prompting factor. It is Japan's clear lag behind America and some advanced West European nations in developing biotechnology, and the need for Japan's combined national and private effort to catch up in this new age wherein the new types of science and engineering, along with space development and

electronic counterparts, could determine the future of every advanced nation.

According to the Ministry, the United States, spearheading the world's biotechnical studies, has recently been reported to be pursuing intensive studies to apply biotechnology to the botanical and crop farming areas. One example is a study to create a new breed of rice to grow without fertilization even in deserts by transferring a gene of some aerial nitrogen self-fixing plant of the pulse family (leguminous plants like beans, peas, and lentils) into the gene of rice. (A similar "no-fertilizer" crop plant study is in progress for years at Japan's National Institute of Genetics in Mishima, southwest of Tokyo.) The Americans, from their own standpoint of national security in food supplies, are collecting all new eligible species of crop plants from Latin America and Asia to create a sort of "botanical gene bank." Numerous American industrial interests, including big international oil conglomerates, have joined such research along with plant breeders.

Japan's own basic studies have been in progress for years

FOR OFFICIAL USE ONLY

at the Ministry's Agricultural Engineering Research Station in Tsukuba, northeast of Tokyo. Starting in Japan's next fiscal year 1982 (from April), the Ministry plans to develop such studies for early applicability.

The initial main theme will be "cell fusion" to develop a new kind of crop plant combining advantages of two or more species of plant by fusing their cells, a sort of gene engineering. Looking for seeds or seed sprouts of some good,

fusable species of crop plant, including cold temperature-defying rice breeds or highly proteinous soybean breeds will be among the prerequisites. The Ministry will name the promotion of such studies as one of the top priorities in its fiscal 1982 budgetary estimate.

The Liberal-Democrats, for their part, plan to set up next month a special research panel in their bid to help build a new agricultural biotechnological

industry in Japan that would eventually be capable of exporting its knowledge and products as a new type of export industry.

The party also logically sees the necessity of combining or at least coordinating both governmental and private studies in Japan to get the earliest possible results. Private exertions of the kind are already on going among Japan's food, fertilizer, chemical, and farming equipment industries, as indicated by their recent creation of a biotechnological joint association named the "New Species Preservation and Development Research Association." All such studies will naturally be expensive, but they are considered worth a great amount of investments, like Japan's past successful joint government-industry program to develop very large-scale integration (VLSI) types of semiconductor.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/312

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

TWELVE DIFFERENT COLORS IDENTIFIED BY UNIQUE SENSOR

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 967, 11 Aug 81 p 13

/Text/

A tiny electronic color sensor capable of identifying up to 12 different colors has been jointly developed by the Nagoya Municipal Industrial Research Institute and a research team of Nagoya University.

According to the non-profit institute of the industrial city of Nagoya, central Japan, the color sensor it has developed with the city's national university engineering faculty team, led by Prof. Minoru Ueda, is an 8-millimeter-square silicon semiconductor substrate topped by three photodiodes and three color filters.

The three photodiodes are "integrated" or combined into a set of circuitry, and each diode is covered with one of three color filters — red, blue, and green (like the basic three colors of color television).

The photodiodes, receiving all colors through the color filters, transmit them to an electronic signal processing system, including a micropro-

cessor, which is behind them. The processing system tells the colors of the target object by judging from the ratio of the three original colors to the whole color composition sensed.

The whole device could be miniaturized, further possibly to only 3 millimeter square, but the size of the substrate has so far received little research attention. The filters purchased from the market could be simply mass-produced through photoetching.

Signal processing system improvements could make the sensor just as color-sensitive as human eyes. All sorts of industrial application of the sensor are envisioned, including sorting of industrial products by color, checking of painting results and quality differentiation of fruits and vegetables, store front point-of-sales slip sorting by color and through conversion of colors into electronic sounds and helping the blind or color blind do industrial product sorting jobs.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/309

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

NIPPON OIL DEVELOPS FERMENTATION METHOD FOR MAKING FUEL ALCOHOL

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 967, 11 Aug 81 p 13

[Text]

A continuous fuel alcohol-producing fermentation process, featuring stabilization of yeast in a sponge-style nestling agent, has been experimentally developed by Nippon Oil Co. and its group.

According to sources close to the top-level Japanese oil-refining company of Tokyo, the conventional fermentation process of making such alcohol or other fermentation products is the so-called batch system. It is not a very efficient round-after-round method of putting raw material and yeast in a fermentation tub, taking out the resulting fermented product and repeating the process. Much yeast is lost in each round and must be replenished.

Although details of the new process are still secret, sources believed a special synthetic resin has been developed and refined into a spongy, elastic, chemical-resistant and yeast-active agent to hold the yeast in the tub to keep it stabilized without mixing with the product, a trouble inevitable with the conventional method.

By using the innovational

yeast holder-booster, it is possible to continue to obtain fuel alcohol or any other fermentation product without a break and with far less loss of yeast than the conventional method, which means much less need for replenishing yeast supplies.

The Nippon Oil group, including Nippon Petrochemicals Co., is believed to have made the most of the latter's highly-advanced high molecular chemical technology. In attempting commercial development of the new method, Nippon Oil has decided to seek the cooperation of Kyowa Hakko Kogyo Co. of Tokyo, Japan's top-rated fermentation food and chemical maker, and a fellow member of the New Fuel Development Technology Research Association. The Nippon Oil group has developed the new process as part of joint studies by the association members. Kyowa Hakko Kogyo, although developing an equivalent process of its own, has so highly evaluated the Nippon Oil group's achievement that it plans to cooperate in commercializing the new process.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/309



FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

STRUCTURAL CHANGE OF PETROCHEMICAL INDUSTRY SUGGESTED

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 967, 11 Aug 81 p 12

/Editorial/

/Text/

Experts at the Industrial Structure Council's Chemical Industry Committee have started attempts to find both short- and long-term policies for the Japanese petrochemical industry to follow in light of the changing environment, such as rising prices for raw materials, slowing demand and rising imports. The committee, led by Dr. Hiromi Aisawa, has been urged to come up with proper prescriptions to demonstrate how Japanese industries and Government should cope with Changing conditions at home and abroad in the 1980s.

The deteriorated petrochemical industry's performance and gloomy outlook stem from the fact that domestic naphtha is more expensive than the raw materials which U.S. and Canadian industries use. As a result, U.S. and Canadian products, especially ethylene derivatives, have invaded the markets Japanese producers had maintained at home and overseas. The raw material cost gap is a deep-rooted problem that also reflects the cost differences in crude oil refining and different strategies chemical companies can take in Japan and North America.

The basic problem is the ethylene price: ¥ 175 a kilogram in Japan, ¥ 110 in the U.S. and ¥ 75 in Canada. If the three countries are allowed to continue to compete freely, ethylene derivatives from the U.S. and Canada will capture Japanese shares of the markets in third countries and increase their shares in Japan. That will cause Japan to reduce production of ethylene, caustic soda and chlorine, for example.

There is no consensus about increasing the availability in North America of ethane, which is extracted from natural gas. Even so, it seems inevitable that external factors will increase that cause Japan to curtail its ethylene production.

It is naturally considered that Japan should invest its capital in countries with lower-cost raw materials for importing inexpensive petrochemical raw materials. The structure of Japan's industry at home should shift to production of goods with higher value-added. The industry itself sees that this cannot be helped.

The urgent problem is to predict as accurately as possible the frictions that such a new strategy will cause and to develop clear measures for adjustment, as made necessary by the structural changes. A final report submitted by the Ministry of International Trade & Industry and industry representatives to the ISC's Chemical Industry Committee clearly shows what Japan should do to wrestle in the 1980s, including raw material problems.

The points that deserve special attention are first the necessity to have the petrochemical industry maintain its managerial capability — a prerequisite for the envisaged industrial adjustment. For that, the naphtha price should be set at the international level. Secondly, the taxes imposed on domestic naphtha will have to be reduced from a strategical viewpoint of the industry's need to shift to products with higher value-added.

FOR OFFICIAL USE ONLY

**FOR OFFICIAL USE ONLY**

Finally, the industry is urged to diversify the petrochemical raw materials by utilizing residual oil and synthetic gas. That will allow the industry to obtain raw materials which can compete with feedstocks available overseas.

It is clear enough that both the petrochemical and oil refining industries will have to find ways for peaceful coexistence and mutual prosperity. It is particularly important to find measures which will help oil companies, especially those with no connection to foreign firms, and petrochemical companies cope with their structural recession and structural improvement.

**COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.**

**CSO: 4120/309**

**FOR OFFICIAL USE ONLY**

## FOR OFFICIAL USE ONLY

## SCIENCE AND TECHNOLOGY

## PRODUCTION REVOLUTION UNDERWAY IN FACTORIES OF SMALLER ENTERPRISES

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 967, 11 Aug 81 p 11

[Article by Katsuhiko Hirano]

[Text]

A veritable production revolution is now rapidly going on among small and medium size corporations. Such corporations are now actively installing in their plants industrial robots, machining centers (MCs), numerically-controlled (NC) lathes and other compound machine tools, usually referred to as "mecha-tronics," a Japanese English word combining mechanics and electronics. The word primarily covers the industrial field which merges machinery technologies with those of electronics. The word has a slightly different shade in meaning to electromechanics used in Western countries. (See "Japanese language today" column on this page.)

**'Blue-collar shortages'**

Small and medium size corporations are even more positive than their big business counterparts in creating unmanned production facilities in their hope of coping with the serious blue-collar shortages and bolstering their competitiveness. By so doing, many want to outgrow the stage of being mere subcontractors and turn themselves into primary

suppliers on their own, offering, at highly competitive prices, a wide variety of products on comparatively limited production scale. Maximum use of mecha-tronics is a major survival strategy of small and medium size corporations in the new decade of the 1980s.

This brush fire trend for unmanned factories is bound to spread to every corner of Japan in a very short while, working a dramatic change in the nation's industrial structure.

Mito Seikei K.K. of Ibaraki Prefecture, a maker of cassette cases for VTRs, for example, has greatly improved its labor productivity recently by successfully combining micro-computer-controlled plastic extruding machines with industrial robots. The company has introduced some 50 plastic extruding machines each priced around ¥25 million, equipped each one of them with an industrial robot and is now operating them virtually around the clock. Thanks to this bold move, the company's sales have been growing at an annual rate of nearly 100 per cent and

ran up to ¥1,950 million in fiscal 1980, although its payrolls have remained at around 80 for the recent several years.

Shima Seiki Seisakusho K.K. of Wakayama Prefecture, a manufacturer of knitting machines, on the other hand, has installed 30 NC machine tools including 10 MCs. By this move, the company hopes to catch up and overtake the pace-setting West German firm in the field of fully-automated knitting machines. Shima Seiki Seisakusho now controls some 70 per cent of the domestic market for automated knitting machines.

Though a minuscule company having only 25 employees, Kobe Seisakusho K.K. of Tokyo, a maker of hydroelectric parts, is now engrossed in "mechatronizing" its plant with use of four NC machine tools and three industrial robots. The company plans to make a completely unmanned plant out of the present production facilities in the next 3 years.

Nojima Seisakusho of Sanjo City, Niigata Prefecture, a secondary sub-contractor of auto-making Honda Motor Co.,

FOR OFFICIAL USE ONLY

## FOR OFFICIAL USE ONLY

has purchased six welding robots each priced at around ¥10 million and has more or less automated the welding processes for automobile seat frames. The company says that by this step, its labor productivity has quadrupled and that the quality of its products has become greatly stabilized and improved.

#### Competitiveness

Use of mecha-tronics by small and medium size corporations is rapidly spreading in a wide range of industrial fields, notably machinery, electro-electric machinery and automobiles.

According to a survey by the Small Enterprise Agency, more than 45 per cent of small and medium size plants throughout Japan (totaling some 700,000) are suffering from perennial shortages of labor. This percentage is far higher than the 20 per cent of big businesses. This fact is the primary reason small and medium size corporations are now so enthusiastic about mecha-tronics.

Small and medium size corporations also hope to cut down on their production costs, improve the quality of their products and increase their competitiveness by taking full advantage of mecha-tronic machinery and equipment.

It is not easy for small and medium size corporations to buy expensive mecha-tronic

machines, but they believe that they have simply to do so in order to survive the fierce competition expected for the rest of the 1980s.

Demands for mecha-tronic equipment naturally have been increasing sharply, thanks to fevered enthusiasm being shown by small and medium size corporations. Production of such leading mecha-tronic equipment as NC lathes, MCs and industrial robots has been growing at an average annual growth rate of some 50 per cent. Some 60 per cent of all the demands for NC machine tools and industrial robots come from small and medium size corporations.

#### Robot-leasing venture

The primary reason small and medium size corporations, with limited financial resources, have been enabled to buy expensive mecha-tronic equipment is that the cost performance of such machinery has improved drastically in the recent several years. The performance of a welding robot or a painting robot, for example, compares favorably with even the best of skilled workers and its price tag is just about 2 years' pay of a skilled worker.

Establishment in April, 1980 of a robot-leasing venture, Japan Robot Leasing Co., a joint venture of 34 firms, including robot makers, also made it

easier for small and medium size corporations to take full advantage of mecha-tronic equipment. By using this company's services, small and medium size firms can install in their own plants expensive industrial robots, each priced about of ¥10 million, for a monthly payment of some ¥100,000. Any small and medium size corporation can afford to pay such an amount if it reduces its payroll by a single worker. This fact is certainly one reason industrial robots are now so popular among small and medium size corporations.

According to a survey by the Small Enterprise Finance Corp., investments for labor-saving and efficiency-improving equipments have come to account for 27.9 per cent of small and medium size corporations' equipment investment programs for the current fiscal year. This percentage outstrips that for equipment-replacement investment for the first time in history. The same survey also reveals that small and medium size corporations' equipment investments in the first half of the current fiscal year record an 11.7 per cent increase over the preceding semi-annual period thanks to the steady recovery of the economy. The "mecha-tronics fever" is bound to get added momentum from all these figures.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/309

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

CABLE, WIRE MAKERS ARE INVESTING HEAVILY IN OPTICAL FIBER EQUIPMENT

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 967, 11 Aug 81 p 9

/Text/

Japanese cable and wire companies are heavily investing in building optical fiber production facilities. They are racing to seek larger shares while the fiber optic system industry is still young.

Sumitomo Electric Industries, Ltd., Furukawa Electric Co. and Fujikura Cable Works, Ltd. are now running ahead of others on the strength of techniques that they have accumulated through a joint research and development project with the governmental Nippon Telegraph & Telephone Public Corp. (NTT). NTT will be by far the largest customer of optical fibers.

The three leaders already have started operation of new production lines capable of producing 2,000 kilometers of optical fibers a month.

Hitachi Cable, Ltd., Showa Electric Wire & Cable Co. and Dainichi-Nippon Cables, Ltd.

are swiftly pursuing the "Big 3." Oki Electric Wire Co. and Ocean Cable Co. are going to move into the promising market.

Sumitomo has just completed a fiber-optic communication system with 7,800 kilometers of optical fibers for shipment to Argentina by teaming up with Nippon Electric Co. (NEC), a leading communications equipment maker. This will be Japan's first full-scale fiber optic communication system export.

Furukawa will shortly install a new line and boost its monthly optical fiber production capacity to 4,000 kilometers, the largest in Japan. Fujikura plans to build a new mass-production line at its Sakura Works in Chiba Pref.

Industry men expect that Sumitomo's sales of fiber optic related products in the current 1981 term will rise to ¥5 billion from ¥3 billion in the

preceding year. Furukawa and Fujikura are estimated to double such sales to ¥2.4 billion and ¥2 billion, respectively, this year.

The present leading position of the Big 3 owes largely to the joint R&D project with NTT. However, as NTT is moving in the direction of "opening its doors" to all companies, discarding its conventional policy of favoring "NTT family" companies, because of mounting criticisms both within and without Japan, chances are strong that the followers will catch up with the three fore-runners.

Cable and wire companies are very enthusiastic about production of optical fibers which will constitute the core of the fiber optic industry. The Ministry of International Trade & Industry estimates that the fiber optic industry will become a ¥100 billion-a-year business in 1985.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/309

FOR OFFICIAL USE ONLY

## FOR OFFICIAL USE ONLY

## SCIENCE AND TECHNOLOGY

## SHIPBUILDERS MOVING TOWARD 'REVITALIZATION'

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 967, 11 Aug 81 p 7

/Text/

Seven top Japanese shipbuilders and three middle raters, which account for almost all the industry's bottom construction, have recently started a new long-range business redevelopment drive. The industry has already pulled out of its past protracted business recession.

According to observers, the industry will completely wipe out all vestiges of its 1974-78 ordeal, a serious demand decline following the 1973 international oil crisis, before the end of fiscal 1981.

Both international and domestic jobs have rebounded briskly since early 1979, indicating that the industry has apparently regained its 1974 level of business, when it still had been prosperous with quite a large backlog of orders. During fiscal 1980, the industry booked 9.29 million gross tons of new orders.

The industry's past practice of accepting all jobs, even at a loss, in order to prevent unem-

ployment will be cleared away by the end of this August when a 320,000-deadweight-ton tanker, the last ship representing such expedencies, is completed.

This fiscal year could be a "new year of revival" for the industry in the light of the ten companies' new highly competitive research projects for energy-saving merchantships. Some new innovations minimize water resistance to propulsion and maximize utilization of engine exhausts for on-board electric power generation. The industry will also develop new business lines by making the most of their oil rig and undersea exploration module building technology.

The Shipbuilders' Association of Japan will also provide overall cooperation by creating various study committees to upgrade the industry's production efficiency, including robotization of production lines, and to create higher value-added kinds of vessels.

## Order Backlogs at Major Shipbuilders at the End of March, 1981

(In billion yen; yr-to-yr change in parentheses in per cent)

Shipbuilder	Value	DWT
Mitsubishi Heavy Industries .....	393.5 (+60.8)	2,550,000 (+37.8)
Ishikawajima-Maruma Heavy Industries .....	291.6 (+38.5)	2,930,000 (+40.2)
Hitachi Shipbuilding & Engineering .....	220.1 (+26.2)	2,050,000 (+4.7)
Mitsui Engineering & Shipbuilding .....	217.8 (+5.0)	1,840,000 (-8.4)
Kawasaki Heavy Industries .....	206.4 (+14.7)	2,090,000 (+49.6)
Nippon Kokan K.K. ....	153.5 (+7.9)	1,370,000 (-0.7)
Sumitomo Heavy Industries .....	103.0 (+87.3)	730,000 (+62.2)
Total .....	1,585.9 (+30.6)	13,580,000 (+21.8)
Sasebo Heavy Industries .....	77.8 (+47.9)	680,000 (+11.3)
Namuro Shipbuilding .....	74.4 (+17.7)	920,000 (-2.5)
Sanoyasu Dockyard .....	61.4 (+12.6)	470,000 (0)

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.  
CSO: 4120/309

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

HITACHI, GE REACH OVERALL ACCORD ON ROBOT PRODUCTION, SALES

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 967, 11 Aug 81 p 7

/Text/

General Electric Co. of the U.S. announced early last week that the company had signed a comprehensive business tie-up with Hitachi, Ltd. on the manufacture and sales of industrial robots, according to Tatsuo Morikawa, Nihon Keizai correspondent in New York.

Morikawa quoted GE officials as saying that behind the tie-up arrangement was the unexpectedly rapid expansion of global robot markets. The swift change in the robot sector was said to have led GE to seek Hitachi's expertise and products.

The agreement, effective over the next seven years, calls for Hitachi to provide GE with its technology and know-how on production of high efficiency industrial robots.

The U.S. company also will receive Hitachi-built robots on

an original equipment manufacturer basis until its own robot production goes on stream.

GE indicated intention to branch out into the robot field in the spring of this year. Since then, the company had been negotiating with Hitachi on the production-marketing link.

The GE-Hitachi tie is the first case of Japanese robot expertise being introduced abroad on a full-fledged basis.

Simultaneously with GE's announcement, Hitachi revealed in Tokyo that the company would increase robot production at its Narashino factory, Chiba Prefecture to 60 to 100 units a month from the present 30 to 50.

A Hitachi spokesman explained that production would be boosted for conforming with the new arrangement with GE.

He said the U.S. company hopes to receive 500-600 robots from Hitachi over the next three to four years for sale in the U.S. under its own brand.

A high-ranking Hitachi official said that the tie-up was signed in Tokyo on July 20. It concerned three models (for painting and welding) now being produced and sold by Hitachi in Japan and does not involve robots that are now being developed or to be developed in the future, he said.

The official said that GE was out to build up its robot division and could be expected to become a strong rival of Hitachi in the future.

As for Hitachi, he declared that the company would continue to exert utmost efforts to develop new products incorporating its most advanced technologies.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/309

FOR OFFICIAL USE ONLY

FOR OFFICIAL USE ONLY

SCIENCE AND TECHNOLOGY

MITI WILL EASE STAND ON EXPORTS TO YAMBURG PROJECT

Tokyo JAPAN ECONOMIC JOURNAL in English Vol 19 No 967, 11 Aug 81 p 3

/Text/

The Ministry of International Trade & Industry has decided on taking a flexible stand toward the issue of Japanese traders and makers supplying materials and machinery for the Soviet Union's Yamburg natural gas-pipeline project.

In line with this policy, MITI is said to be intending to apply the export insurance system to sale of pipe-layers by Komatsu, Ltd. in the event the latter successfully concludes its present negotiations with the Russians.

Up to now, the Ministry had been taking a negative stance toward the Yamburg project as a part of Japan's economic sanctions against the Soviet Union.

However, MITI has come around now to allowing application of the export insurance system in what would be tantamount to easing sanctions against the Soviet Union

because, after the Ottawa summit, the U.S. has permitted an American maker to export heavy machinery to it and the West German Government also has decided to permit extension of government credits to it.

The Yamburg project envisages laying down a gas pipeline running a total of about 4,400 kilometers from the Yamburg natural gas field in Western Siberia to the Czechoslovakian border.

It will be used for transporting 40 billion cubic meters of gas yearly (700,000 barrels daily in terms of oil) to West European nations, such as West Germany, France and Italy, over a period of 20 years.

For realizing the project, the Russians hope to buy about \$15 billion worth of large diameter steel pipes, compressors, tractors and pipe-layers from the Western nations. Of this amount, it is believed that the

Russians wish to secure about \$3 billion worth (¥600 billion) of equipment from Japanese traders and makers.

Komatsu's present negotiations with the Russians on selling pipe-laying equipment appears to come under the scope of the \$3 billion framework. The Russians are regarded to be intending to order about 400 pipe-layers, valued at slightly over \$100 million.

As for the U.S. Commerce Department's sanctions recently of Caterpillar Tractor Co.'s export of heavy machinery to the USSR, it also involved pipe-layers.

The West German Government's credit to the Soviet Union also was for the Yamburg pipeline project. The Russians will get credit amounting to about 5 billion DM. Originally, a credit of 10 billion DM had been planned.

COPYRIGHT: 1981, the Nihon Keizai Shimbun, Inc.

CSO: 4120/309

END

FOR OFFICIAL USE ONLY